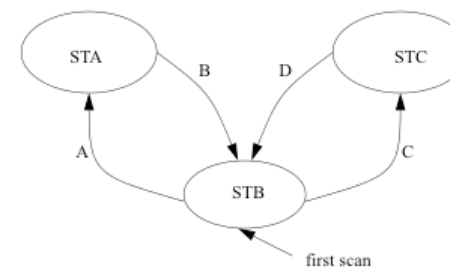


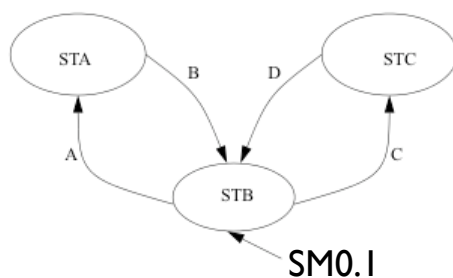
## Stavové riadenie pomocou LAD

Michal Kvasnica

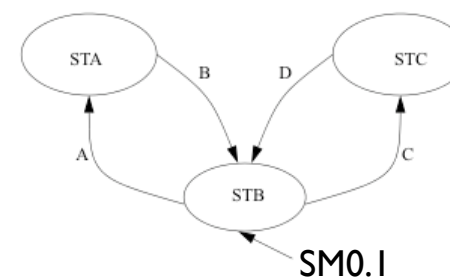
## Stavový diagram



## First scan

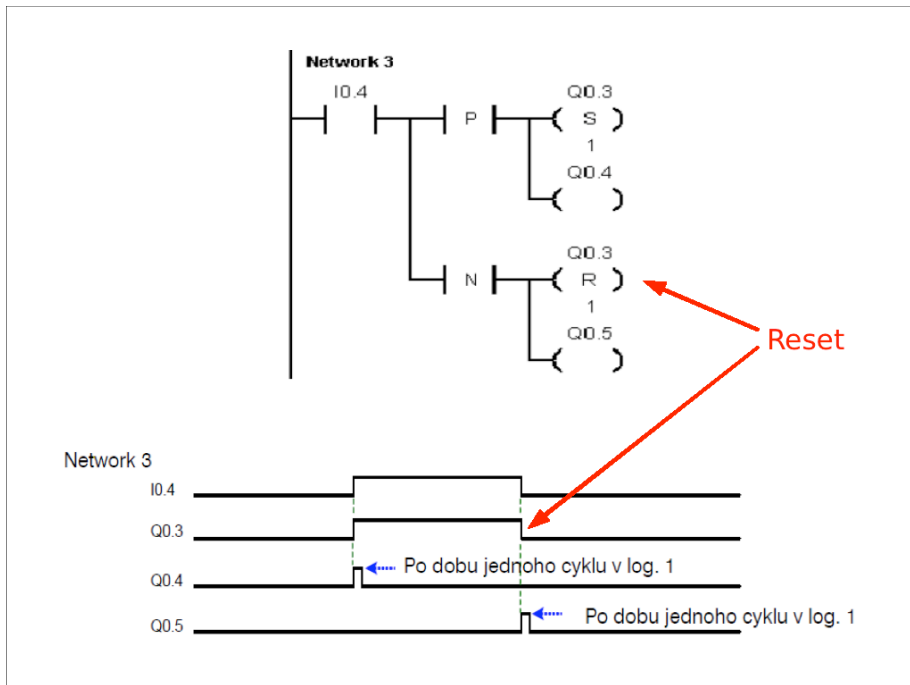
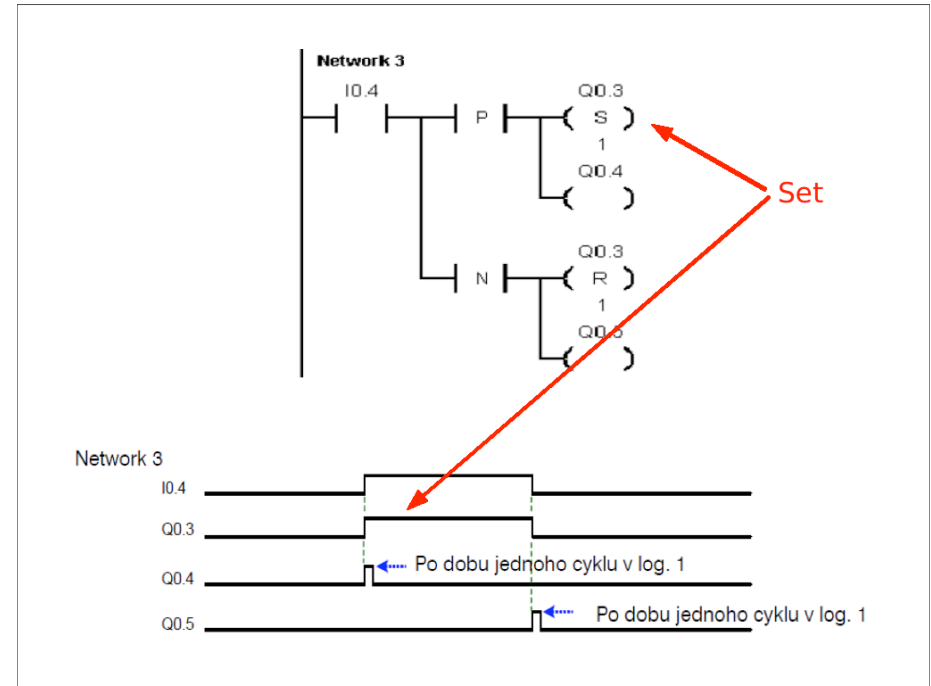
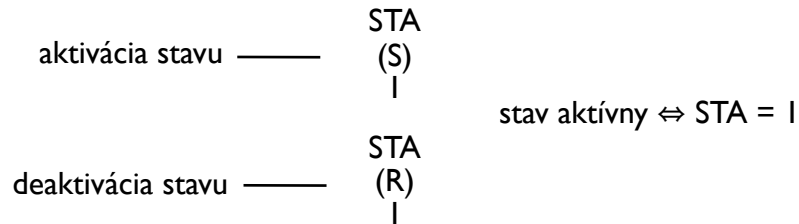
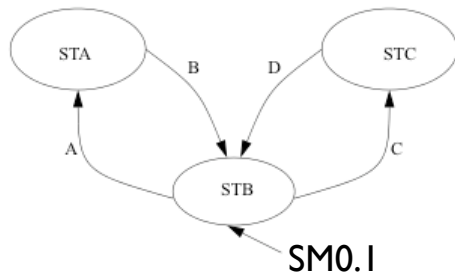


## Princípy implementácie

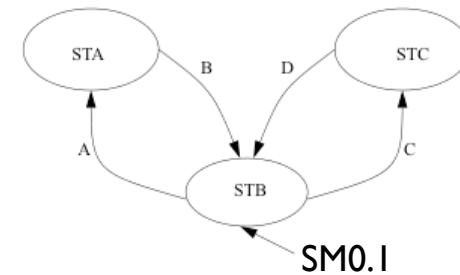


- reprezentácia stavov pomocou set a reset blokov
- vytvorenie podmienok pre aktiváciu stavov
- vytvorenie entry, during a exit akcií

# Set-Reset implementácia

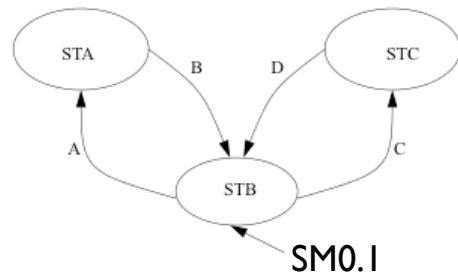


# Princípy implementácie



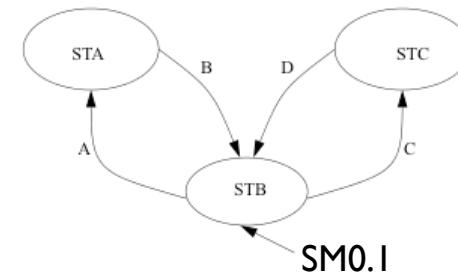
- reprezentácia stavov pomocou set a reset blokov
- vytvorenie podmienok pre aktiváciu stavov
- vytvorenie entry, during a exit akcií

## Podmienky aktivácie stavov



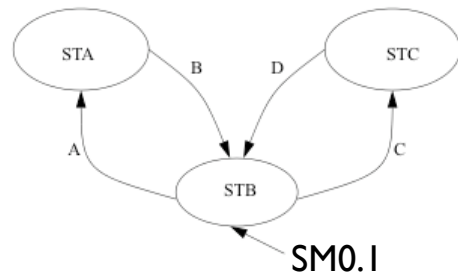
| Podmienka | STA | STB | STC |
|-----------|-----|-----|-----|
| SM0.1     | 0   | 1   | 0   |
| STB & A   | 1   | 0   | 0   |
| STB & C   | 0   | 0   | 1   |
| STA & B   | 0   | 1   | 0   |
| STC & D   | 0   | 1   | 0   |

## Prečo STA & B a nie len B ?



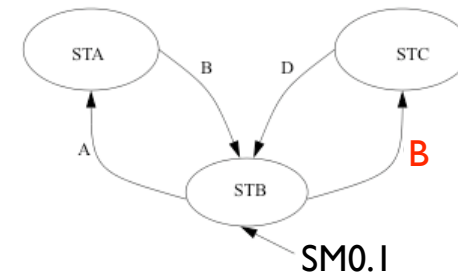
| Podmienka | STA | STB | STC |
|-----------|-----|-----|-----|
| SM0.1     | 0   | 1   | 0   |
| STB & A   | 1   | 0   | 0   |
| STB & C   | 0   | 0   | 1   |
| STA & B   | 0   | 1   | 0   |
| STC & D   | 0   | 1   | 0   |

## Prečo STA & B a nie len B ?



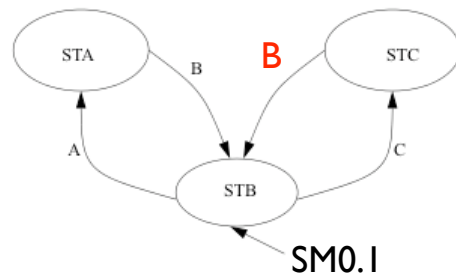
| Podmienka | STA | STB | STC |
|-----------|-----|-----|-----|
| SM0.1     | 0   | 1   | 0   |
| A         | 1   | 0   | 0   |
| C         | 0   | 0   | 1   |
| B         | 0   | 1   | 0   |
| D         | 0   | 1   | 0   |

## Prečo STA & B a nie len B ?



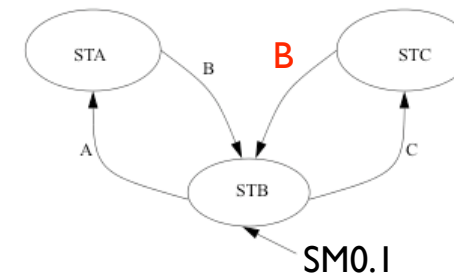
| Podmienka | STA | STB | STC |
|-----------|-----|-----|-----|
| SM0.1     | 0   | 1   | 0   |
| A         | 1   | 0   | 0   |
| B         | 0   | 0   | 1   |
| B         | 0   | 1   | 0   |
| D         | 0   | 1   | 0   |

## Prečo STA & B a nie len B ?



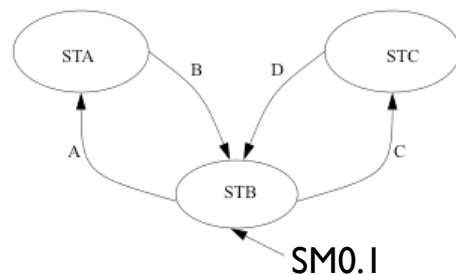
| Podmienka | STA | STB | STC |
|-----------|-----|-----|-----|
| SM0.1     | 0   | 1   | 0   |
| A         | 1   | 0   | 0   |
| <b>B</b>  | 0   | 0   | 1   |
| C         | 0   | 1   | 0   |
| <b>B</b>  | 0   | 1   | 0   |

## Podmienky aktivácie stavov



| Podmienka | STA | STB | STC |
|-----------|-----|-----|-----|
| SM0.1     | 0   | 1   | 0   |
| STB & A   | 1   | 0   | 0   |
| STB & C   | 0   | 0   | 1   |
| STA & B   | 0   | 1   | 0   |
| STC & B   | 0   | 1   | 0   |

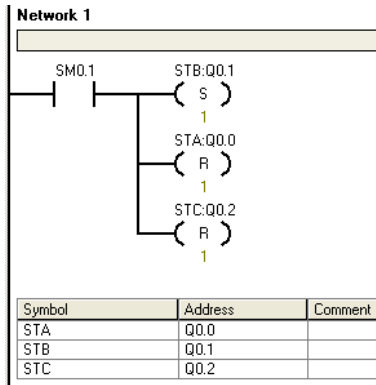
## Podmienky aktivácie stavov



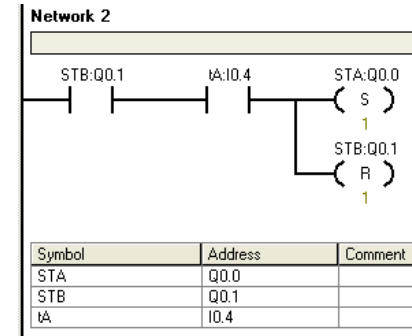
| Podmienka | STA | STB | STC |
|-----------|-----|-----|-----|
| SM0.1     | 0   | 1   | 0   |
| STB & A   | 1   | 0   | 0   |
| STB & C   | 0   | 0   | 1   |
| STA & B   | 0   | 1   | 0   |
| STC & D   | 0   | 1   | 0   |

## LAD implementácia

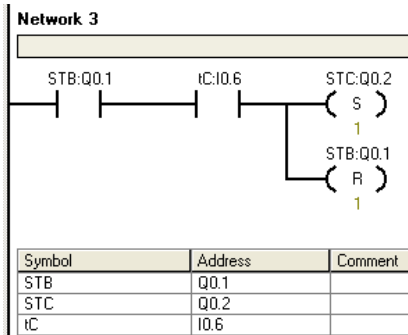
- jedna sieť pre jednu prepínaciu podmienku



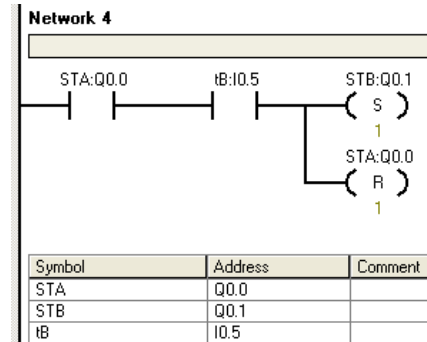
| Podmienka | STA | STB | STC |
|-----------|-----|-----|-----|
| SM0.1     | 0   | 1   | 0   |
| STB & A   | 1   | 0   | 0   |
| STB & C   | 0   | 0   | 1   |
| STA & B   | 0   | 1   | 0   |
| STC & D   | 0   | 1   | 0   |



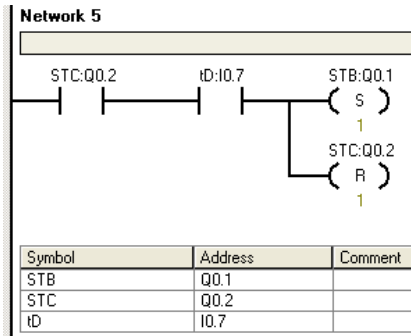
| Podmienka | STA | STB | STC |
|-----------|-----|-----|-----|
| SM0.1     | 0   | 1   | 0   |
| STB & A   | 1   | 0   | 0   |
| STB & C   | 0   | 0   | 1   |
| STA & B   | 0   | 1   | 0   |
| STC & D   | 0   | 1   | 0   |



| Podmienka | STA | STB | STC |
|-----------|-----|-----|-----|
| SM0.1     | 0   | 1   | 0   |
| STB & A   | 1   | 0   | 0   |
| STB & C   | 0   | 0   | 1   |
| STA & B   | 0   | 1   | 0   |
| STC & D   | 0   | 1   | 0   |



| Podmienka | STA | STB | STC |
|-----------|-----|-----|-----|
| SM0.1     | 0   | 1   | 0   |
| STB & A   | 1   | 0   | 0   |
| STB & C   | 0   | 0   | 1   |
| STA & B   | 0   | 1   | 0   |
| STC & D   | 0   | 1   | 0   |

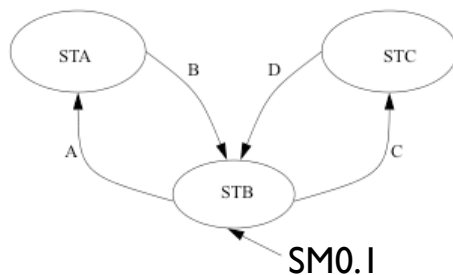


| Podmienka          | STA      | STB      | STC      |
|--------------------|----------|----------|----------|
| SM0.1              | 0        | 1        | 0        |
| STB & A            | 1        | 0        | 0        |
| STB & C            | 0        | 0        | 1        |
| STA & B            | 0        | 1        | 0        |
| <b>STC &amp; D</b> | <b>0</b> | <b>1</b> | <b>0</b> |

## LAD implementácia

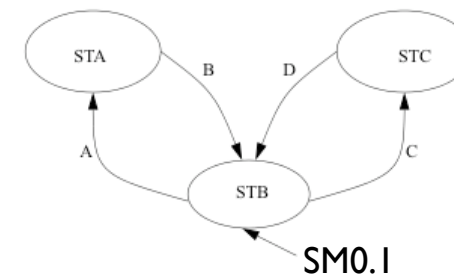
- jedna sieť pre jednu prepínicu podmienku
- prečo nie jedna sieť pre jeden stav?

## Princípy implementácie



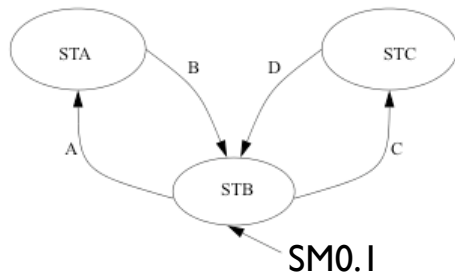
- reprezentácia stavov pomocou set-reset blokov
- vytvorenie podmienok pre aktiváciu stavov
- vytvorenie entry, during a exit akcií

## Entry, during, exit akcie

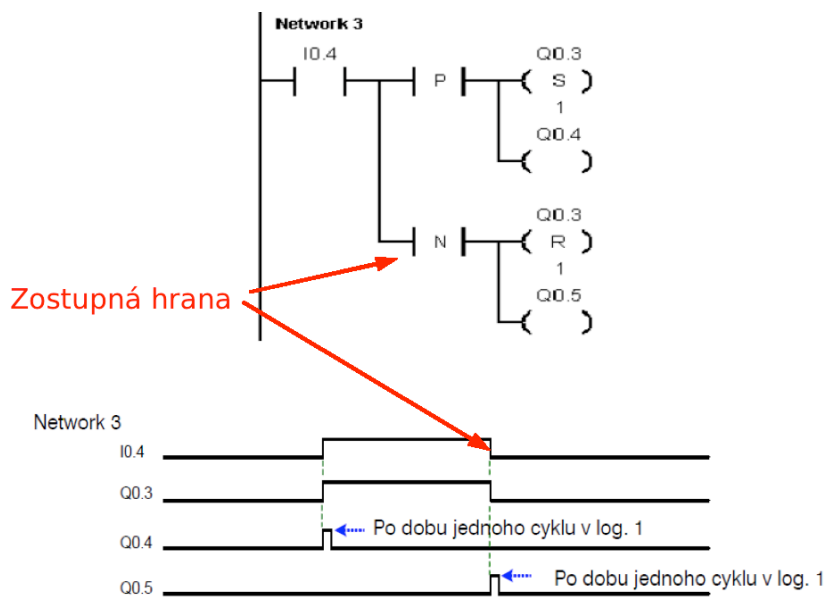
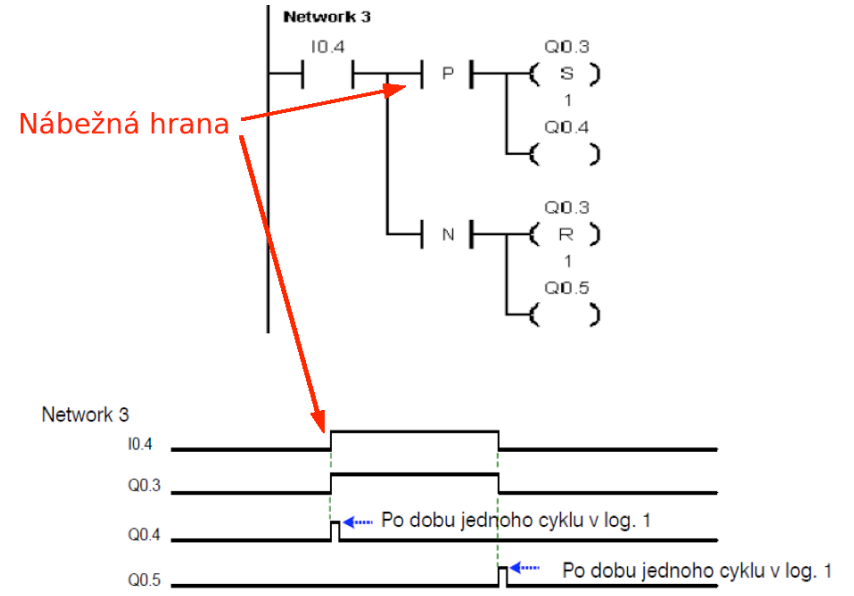


| Akcia  | Vykonaná pri                  |
|--------|-------------------------------|
| entry  | aktivácii vstupnej podmienky  |
| exit   | aktivácii výstupnej podmienky |
| during | hodnote STA = 1               |

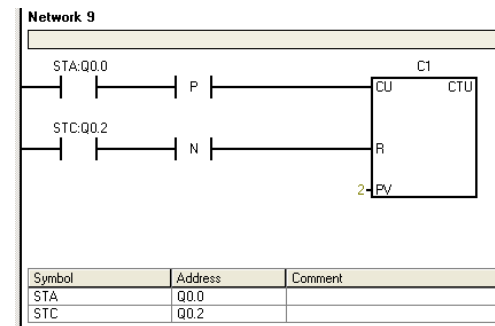
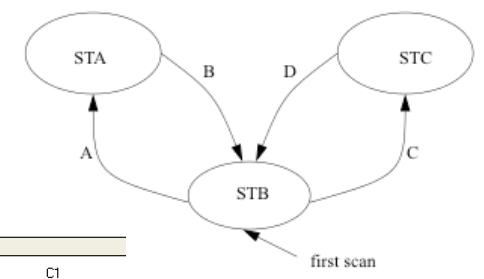
## Entry, during, exit akcie



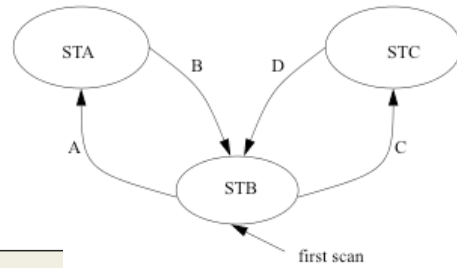
|        |                    |
|--------|--------------------|
| Akcia  | Vykonaná pri       |
| entry  | zmene STA z 0 na 1 |
| exit   | zmene STA z 1 na 0 |
| during | STA = 1            |



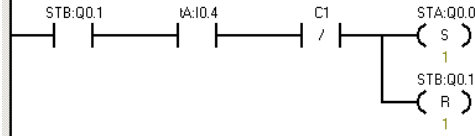
## Entry a exit akcie



# During akcia

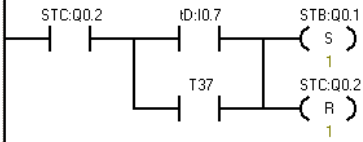


## Network 2



| Symbol | Address | Comment |
|--------|---------|---------|
| STA    | Q0.0    |         |
| STB    | Q0.1    |         |
| IA     | I0.4    |         |

## Network 5



| Symbol | Address | Comment |
|--------|---------|---------|
| STB    | Q0.1    |         |
| STC    | Q0.2    |         |
| ID     | I0.7    |         |

